IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

INTERMEC IP CORP., a Delaware corporation,	)	
Plaintiff,	)	
v.	)	Civil Action No. 04-CV-357 (GMS)
SYMBOL TECHNOLOGIES, INC., a Delaware corporation,	)	
Defendant.	)	

SYMBOL'S OPENING CLAIM CONSTRUCTION BRIEF

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I. INTRODUCTION

The parties submitted a Joint Claim Construction Chart to the Court on July 18, 2005 (D.I. 67) for the asserted claims of the four patents-in-suit, which are:

- U.S. Patent No. 5,528,222 (the "'222 Patent") – claim 1;
- U.S. Patent No. 5,995,019 (the "'019 Patent") – claims 1, 3, 9, 11, 16 and 18;
- U.S. Patent No. 5,912,632 (the "'632 Patent") – claims 1, 13, 22 and 28; and
- U.S. Patent No. 6,371,375 (the "'375 Patent") – claim 1.[1]

In the Joint Claim Construction Chart (Exhibit 1),[2] the parties have identified the claim limitations in dispute and have underlined those limitations therein for the convenience of the Court. The remaining limitations, shaded in gray, are not in dispute.

The parties have agreed that each party's opening brief will be directed to arguments supporting that party's claim construction, while the reply briefs will be directed to explaining why the other party's claim construction is incorrect and should not be adopted.

A *Markman* claim construction hearing on these four patents is scheduled for September 7, 2005.

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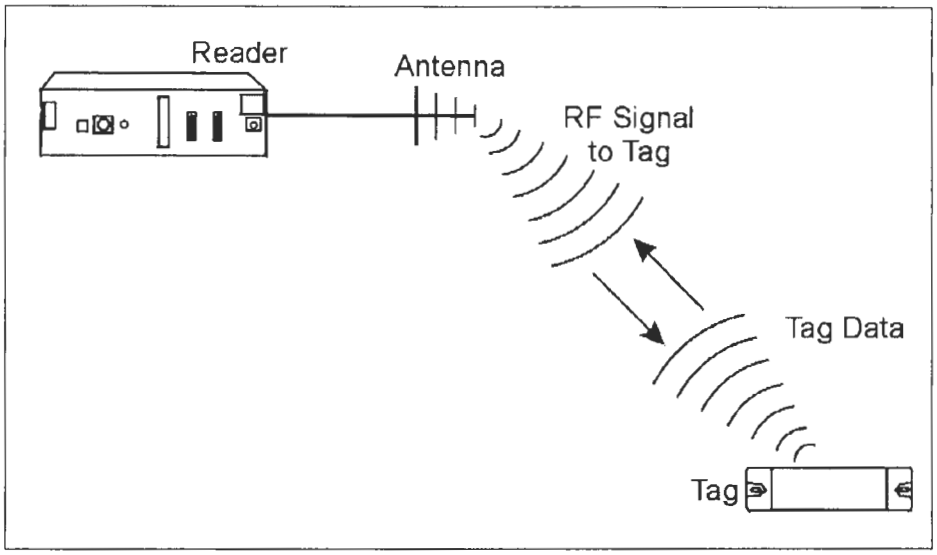
[1] Because the parties agree on the construction of all of the limitations of this claim, there is nothing for the Court to construe and the '375 patent is not addressed herein.

[2] All exhibits cited herein are separately bound in the Appendix of Exhibits in Support of Symbol's Claim Construction filed herewith.

II. BACKGROUND

A. General Description Of The Technology In This Patent Case

This is a patent case involving radio frequency identification ("RFID") systems. A typical RFID system is shown below:

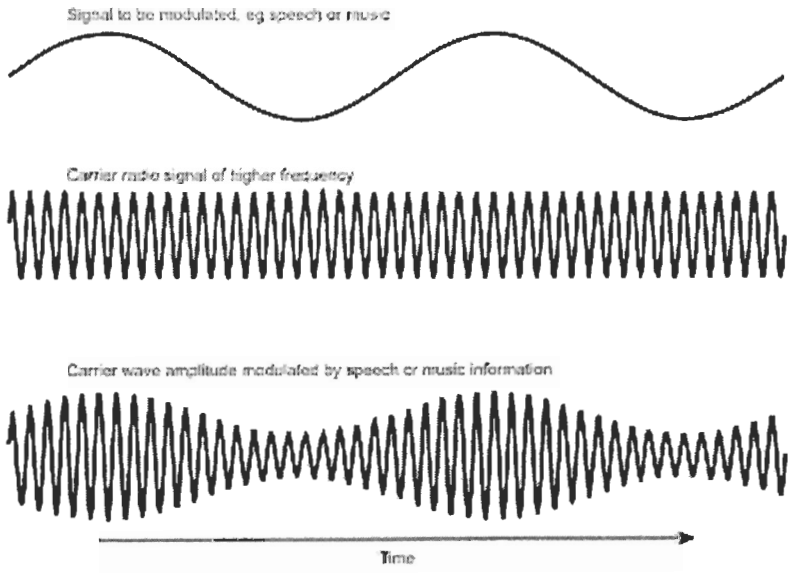


An RFID system includes one or more base stations (also known as readers) and one or more tags (transponders) that are "interrogated" by the readers using radio frequency (RF) signals to obtain information from the tags, usually a unique identification number stored in the tag.

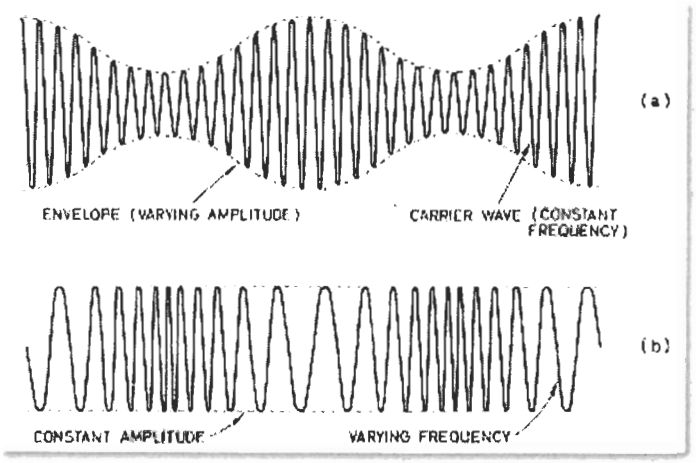
The communication between the readers and the tags is similar to the way in which information is transmitted by a radio station to a listener. For example, when you tune to a radio station such as WHYY 90.9 on the FM dial, that means that the radio station is transmitting with a carrier frequency of 90.9 million cycles per second (or Megahertz, usually abbreviated as MHz), which is the carrier frequency assigned to that station by the FCC. Other stations are assigned different carrier frequencies so that their signals can be transmitted at the same

time, without interfering with each other. The tuner on your radio allows you to select the carrier frequency of the station you want to hear.

The information that is transmitted with the carrier frequency is sent by what is called "modulating" the carrier frequency; that is, changing the carrier wave in a way that will encode information such as music or speech. The AM band of the radio is so named because it uses "amplitude" modulation to encode information. An illustration of amplitude modulation is given below:



The FM band uses "frequency" modulation to encode information. In frequency modulation, the information is encoded in changes in the frequency of the carrier wave, whereas in amplitude modulation, the information is encoded in the amplitude of the carrier wave. The differences between the two are illustrated in the figure below, where (a) shows amplitude modulation (AM) of a carrier wave, and (b) shows frequency modulation (FM) of a carrier wave:



The information that is modulated on the carrier frequency illustrated above is at a different frequency (much lower) than the carrier frequency and is called the modulation frequency. A radio tuner is able to determine this modulation frequency and extract the encoded information from the carrier wave, so that the listener hears music or talk, as the case may be.

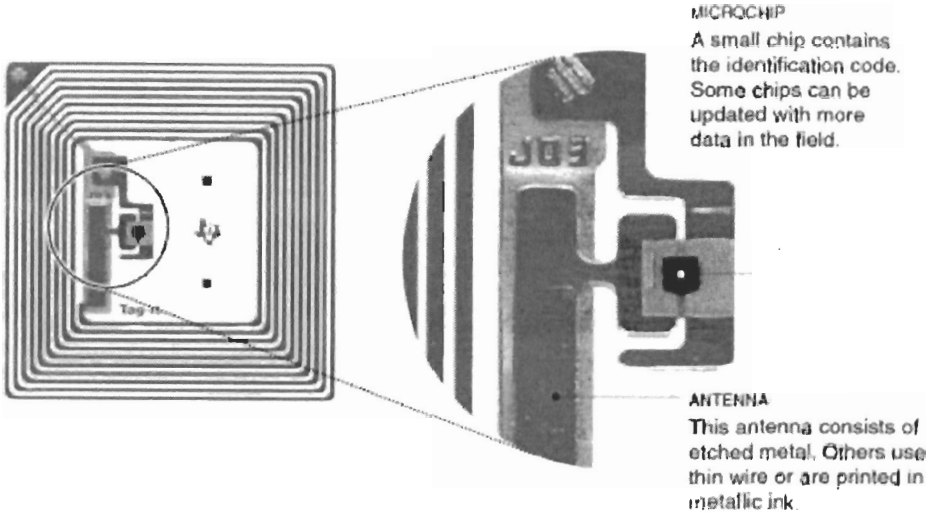
In an RFID system, each tag has a unique identification code. The reader can communicate with the tag by sending a carrier wave to the tag that is modulated at a modulation frequency (this communication is also known as an "interrogation") with a message such as a "read" command. The tag receives the wave and extracts the information encoded in the modulation by the reader. If the message is a command to read the tag identification code, the tag then sends an RF signal back to the reader (typically called a "backscatter" signal), which is a carrier wave that is modulated by the tag with the tag's identification code by, for example, amplitude or frequency modulation.

Probably the most common example of an RFID system is the E-ZPass automatic toll payment system that is used in the Northeast of the United States.

In that system, the tags are small boxes that are mounted on the windshield or bumper of a vehicle and are read by readers mounted at toll booths along the highways. As a vehicle passes, the reader interrogates the tag to obtain its unique identification code that is stored in the tag. The reader or a computer connected to it includes a database with the user account information linked to the unique identification code of the tag. The system is able to charge the account of the user the appropriate amount of the toll that is owed after reading the tag's unique identification code.

RFID can also be used for inventory control, where the tags are placed on individual items and have information stored in the tags specific to the item, such as its size, color, type, etc. The tags are interrogated to determine the number of items that are on the shelves of each type or size or color.

Depending on the use of the tag, it will have a different size and/or shape. Clearly, a tag that is used on a clothing label must be much less bulky than one used on the windshield of a vehicle. Therefore, many RFID tags are small and have an adhesive surface to stick to a label or a product box, such as a carton for a television. Other tags, such as those used in the E-ZPass system, are larger and thicker since their size and shape requirements are different. An example of an RFID tag (in approximately its actual size) suitable for placement on a label is shown below:



The basic components of an RFID tag are an antenna for receiving the RF signal from the reader and for transmitting a backscattered RF signal to the reader and a microchip or integrated circuit (made from semiconductor material and therefore sometimes referred to as a circuit chip). The integrated circuit has a memory circuit for storing a unique identification code, a receiving circuit for processing the received RF signal, and a transmitting circuit for transmitting an RF signal back to the reader with the identification code modulated therein. The antenna and integrated circuit are usually mounted on a common base called a substrate and are covered with protective layers. The memory circuit that stores the identification code may be a read-only memory, or it can be a read-write memory that allows the reader to write additional information into it as desired.

RFID tags can optionally include a battery that would also be mounted on the substrate. A tag with a battery is called an "active" tag, and a tag without a battery is called a "passive" tag. The passive tag obtains all of its power from the

interrogating RF signal from the reader, whereas the active tag also gets its power from the battery.

Each of the four Intermec patents-in-suit relates to a specific aspect of a tag, a reader, or the tag and the reader in combination. These patents, and the specific claim limitations requiring interpretation by the Court, are described in turn below, following a discussion of the applicable legal principles to be used in construing these claims.

III. THE LAW OF CLAIM INTERPRETATION

A. General Rules Of Claim Construction

The construction of a patent, including terms of art within its claims, is a question of law exclusively within the province of the court. *Markman v. Westview Instruments, Inc.*, 517 U.S. 370, 372 (1996). The focus of the Court in construing a patent claim is on what one skilled in the art would have understood the claim to mean at the time of the invention. *Nazomi Communications, Inc. v. Arm Holdings, PLC*, 403 F.3d 1364, 1369 (Fed. Cir. 2005); *Multiform Desiccants Inc. v. Medzam Ltd.*, 133 F.3d 1473, 1477 (Fed. Cir. 1998).

"It is a 'bedrock principle' of patent law that 'the claims of a patent define the invention to which the patentee is entitled the right to exclude.'" *Phillips v. AWH Corp.*, No. 03-1269, 2005 WL 1620331, at *4 (Fed. Cir. July 12, 2005) (en banc) (Exhibit 2) (quoting *Innova/Pure Water, Inc. v. Safari Water*, 381 F.3d 1111, 1115 (Fed. Cir. 2004)). Claims "are generally given their ordinary and customary meaning, [i.e.], the meaning that the term [in the claim] would have to a person of

ordinary skill in the art in question at the time of the invention." *Phillips*, 2005 WL 1620331, at *5 (quotations and citations omitted). This inquiry "into how a person of ordinary skill in the art understands a claim term provides an objective baseline from which to begin claim interpretation." *Phillips*, 2005 WL 1620331, at *5 (citing *Innova*, 381 F.3d at 1116).

"[T]he person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification." *Phillips*, 2005 WL 1620331, at *5. "Because the meaning of a claim term as understood by persons of skill in the art is often not immediately apparent, and because patentees frequently use terms idiosyncratically, the court looks to 'those sources available to the public that show what a person of skill in the art would have understood disputed claim language to mean,'" including intrinsic evidence such as "'the words of the claims themselves, the remainder of the specification, the prosecution history and extrinsic evidence concerning relevant scientific principles, the meaning of technical terms, and the state of the art.'" *Phillips*, 2005 WL 1620331, at *6 (quoting *Innova*, 381 F.3d at 1116). The extrinsic evidence is "'less significant than the intrinsic record in determining the legally operative meaning of claim language.'" *Phillips*, 2005 WL 1620331, at *10 (quoting *C.R. Bard, Inc. v. U.S. Surgical Corp.*, 388 F.3d 858, 862 (Fed. Cir. 2004)).

"Quite apart from the written description and the prosecution history, the claims themselves provide substantial guidance as to the meaning of particular

claim terms." *Phillips*, 2005 WL 1620331, at *6 (citing *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)). The "context in which a term is used in the asserted claim," the use of the term in "[o]ther claims of the patent in question, both asserted and unasserted" and "[d]ifferences among claims" are all instructive to a Court in construing the meaning of a claim term. *Phillips*, 2005 WL 1620331, at *6-7.

"The claims, of course, do not stand alone." *Phillips*, 2005 WL 1620331, at *7. They "'must be read in view of the specification, of which they are a part.'" *Id.* (quoting *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 978 (Fed. Cir. 1995)). The specification "'is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.'" *Phillips*, 2005 WL 1620331, at *7 (quoting *Vitronics*, 90 F.3d at 1582). "[T]he specification may reveal a special definition given to a claim term by the patentee that differs from the meaning it would otherwise possess. In such cases, the inventor's lexicography governs. . . . In other cases, the specification may reveal an intentional disclaimer, or disavowal, of claim scope by the inventor." *Phillips*, 2005 WL 1620331, at *8 (citations omitted).

In addition to consulting the specification, the Federal Circuit has held that a court "should also consider the patent's prosecution history, if it is in evidence." *Phillips*, 2005 WL 1620331, at *9 (quoting *Markman*, 52 F.3d at 980). "[T]he prosecution history can often inform the meaning of the claim language by demonstrating how the inventor understood the invention and whether the inventor

limited the invention in the course of prosecution, making the claim scope narrower than it would otherwise be." *Phillips*, 2005 WL 1620331, at *10 (citation omitted).

* * *

With these principles as context, we show below why the disputed claim terms should be construed as Symbol proposes.

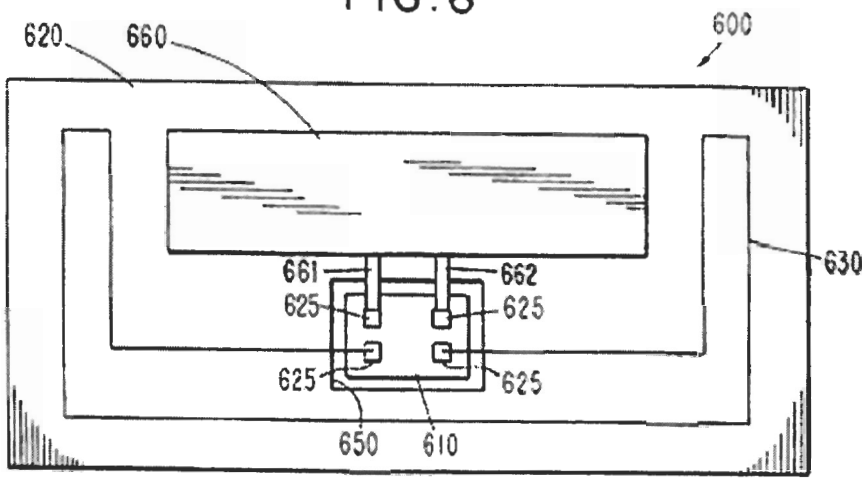
IV. THE PROPER CONSTRUCTION OF THE ASSERTED CLAIMS OF THE INTERMEC PATENTS

A. THE '222 PATENT

Claim 1 of the '222 Patent is the only asserted claim. It relates to making an RFID tag thin and flexible so that it can be mounted on flexible items, such as a passport cover, a postage stamp or an admission ticket. '222 Patent, Ex. 3 at col. 2, line 66 – col. 3, line 6.

According to the '222 Patent, the RFID tag of the invention includes standard tag components, such as an antenna and an integrated circuit or circuit chip, that are electrically connected and mounted on a substrate. Ex. 3 at col. 3, lines 9-15. An example of a top view of a tag is shown in Figure 6 of the '222 Patent below, in which the component have been labeled for the sake of clarity:

FIG. 6



The objective of the invention is achieved by using a flexible substrate, placing the antenna and all of the electrical connections in a single plane of wiring with no "vias" or "crossovers" (which will be explained hereinafter), and placing the components next to each other so that they are not stacked. Ex. 3 at col. 3, lines 15-21.

The '222 Patent describes the way in which existing, prior art RFID tags were configured, such that they were generally bulky and lacked flexibility. For instance, in a section of the '222 Patent specification entitled "Problems With The Prior Art," the applicants summarize the supposed shortcomings of the prior art:

> The prior art has failed to produce a thin tag because: care is not been [sic] taken to make each of the elements thin; elements are stacked one upon the next; and the antenna and connecting conductors require more than one plane of electrical wiring, ie. the designs use cross-overs for completing interconnections. As elements are stacked and layers are added the package grows thicker and flexibility is lost.

Ex. 3 at col. 2, lines 45-52.

To overcome the alleged deficiencies of the prior art, the '222 Patent teaches, in addition to the use of a flexible substrate, placing all of the connections on a single plane of wiring and avoiding stacking of the components. Ex. 3 at col. 3, lines 15-21. The top view of Figure 6 shows the components next to each other and not stacked.

The use of a single plane of wiring limits the number of layers on the substrate and thus reduces its thickness. A typical substrate, such as a printed circuit board, has conductive layers on its top and bottom surfaces. The two conductive layers are connected to each other, for example, by drilling a hole in the substrate and filling it with a conductor that connects the conductors on the two layers. This connection is called a "via." Alternatively, the printed circuit board could have two layers of conductors on one surface, with an intermediary insulating layer between them. A conductor in the second layer that connects two conductors in the first layer is called a "crossover." The '222 Patent teaches that by placing all of the conductors in a single wiring plane, the need for crossovers and vias is eliminated. The resulting tag would also be thinner. Ex. 3 at col. 4, lines 20-22.

The placing of the components next to each other—and not physically stacked on top of one another—reduces the thickness of the tag. Ex. 3 at col. 4, lines 22-26. This is analogous to placing all of the rooms of a home next to each other on one level as in a ranch-style home, rather than stacking them on top of one another as in a colonial-style home. Obviously, the unstacked structure is lower than the stacked structure.

The allegedly novel concepts of the invention, as described above, are set forth in claim 1 using language that is clearly defined by the patentee in the patent and its prosecution file history, as explained below.

1. **Independent Claim 1**

Claim 1 is an independent claim and is recited in its entirety below (with disputed terms underlined):

> 1. A thin flexible electronic radio frequency tag circuit comprising;
>
> a. an insulating, flexible substrate;
>
> b. an antenna that is an integral part of the substrate and that has terminals;
>
> c. a circuit chip having a modulator circuit, a logic circuit, a memory circuit, and chip connectors and being on the substrate in adjacent proximity to the antenna; and
>
> d. one or more connecting lines between the antenna terminals and the chip connectors, the connecting lines being coplanar with the antenna and antenna terminals.

a. "adjacent proximity" means "close with no stacking"

In claim construction, the Court is often faced with trying to determine a patentee's intent as to what a claim term means. But, as demonstrated in the excerpt from the file history reproduced below, in the '222 Patent, the answer is simple: the patentees specifically defined the term "adjacent" in the claim as originally filed to mean "no stacking of elements":

~~1. A thin flexible electronic radio frequency tag circuit comprising:~~

a. an insulating, flexible substrate;

b. an antenna that is an integral part of the substrate and that has terminals;

c. a circuit chip having a modulator circuit, a logic circuit, a memory circuit, and chip connectors and being on the substrate in adjacent proximity to the antenna;

d. one or more connecting lines between the antenna terminals and the chip connectors, the connecting lines being coplanar with the antenna and antenna terminals. (coplanar means no vias, crossovers, etc. single plane of wiring. Adjacent means no stacking of elements.)

'222 File History, Ex. 4, Tab A, Application as originally filed on September 9, 1994 at 10 (emphasis added).

During prosecution of the application, the Examiner objected to the use of the parenthetical definition of adjacent in claim 1 and asked that it be deleted:

2. Claims 1-25, & 27-29 are objected to because of the following informalities: In lines 8-9 of claim 1, "(coplanar ... elements)" must be deleted. In line 1 of claims 2-9, 12-16,

'222 File History, Ex. 4, Tab B, Office Action dated April 13, 1995 at 3.

Although the patentee's deleted their parenthetical definition of "adjacent" from the claim, it was not for the purpose of changing its meaning, but only to accommodate the Examiner's objection to the "informality" of a parenthetical in the claim. The patentees' definition is part of the original disclosure of the patent and is therefore the best intrinsic evidence of the patentees' intent that the term "adjacent" means "no stacking of elements." Moreover, this meaning is precisely how the patentees defined the term "adjacent proximity" throughout the patent specification:

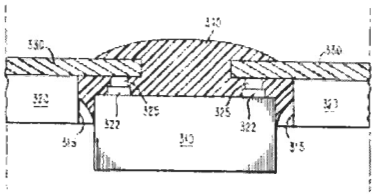
> Further novelty of the invention includes arranging the components (chip and antenna and possibly a battery) in

> adjacent proximity to one another. This means that the components are close (i.e., not stacked).

Ex. 3 at col. 4, lines 22-26 (emphasis added).

Further support for this construction is found in the "Summary of the Invention," where the patentees state that in their invention, "[t]he elements of the package [tag] are placed adjacent to one another, i.e., they are not stacked." Ex. 3 at col. 3, lines 19-20 (emphasis added). Accordingly, this term should be construed as the patentees defined it. *Phillips*, 2005 WL 1620331, at *8; *C.R. Bard*, 388 F.3d at 864-65 (holding that the patentees "explicitly define[]" the claim term at issue in the "Summary of the Invention" portion of the specification); *Ethicon Endo-Surgery, Inc. v. U.S. Surgical Corp.*, 93 F.3d 1572, 1578 (Fed. Cir. 1996) (holding that patentees "unambiguously described" the claim term at issue in the specification).

In each of the instances cited above discussing the use of the term "adjacent proximity," the patentees referred to the elements or the components of the tag, *i.e.*, the circuit chip, the antenna and battery. By doing so, the patentees have expressly stated that the proper construction of the phrase "in adjacent proximity to" means "close with no stacking." In the context of claim 1, this means that the elements or components, including the antenna and the circuit chip, are on the substrate close to the each other but not physically on top of one another. This is shown in the excerpt below of Figure 3 of the '222 Patent, where circuit chip 310 is in a hole or window 315 in the substrate 320 so it is not stacked on top of antenna 330 on the substrate 320.



This allows the overall tag structure to be thinner, such as in the analogy of the ranch-style house.

b. "connecting lines" and "antenna and antenna terminals" are "coplanar" means "a single plane of wiring"

Here again, the patentees have simplified the Court's task of defining the term "coplanar" by defining it in the claims as originally filed:

~~1. A thin flexible electronic radio frequency tag circuit comprising:~~

a. an insulating, flexible substrate;

b. an antenna that is an integral part of the substrate and that has terminals;

c. a circuit chip having a modulator circuit, a logic circuit, a memory circuit, and chip connectors and being on the substrate in adjacent proximity to the antenna;

d. one or more connecting lines between the antenna terminals and the chip connectors, the connecting lines being coplanar with the antenna and antenna terminals. (coplanar means no vias, crossovers, etc. single plane of wiring. Adjacent means no stacking of elements.)

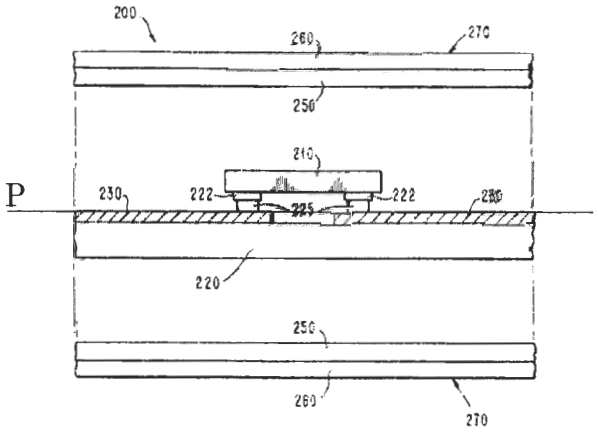
Ex. 4, Tab A, Application as originally filed on September 9, 1994 at 10 (emphasis added).

Similar to the "adjacent proximity" limitation, although the patentees were required to delete the parenthetical definition of "coplanar" from the claim due to the Examiner's "informality" objection, it is part of the original disclosure of the patent and is therefore the best intrinsic evidence of the patentees' intent that the term "coplanar" means a "single plane of wiring." Moreover, this meaning is precisely how the patentees defined the term in the patent specification. In the '222 Patent, the patentees explain that "[b]y using only one level of metal to produce

the antenna and interconnections, the package is kept thin." Ex. 3 at col. 4, lines 20-22. Furthermore, in referring to Figure 6, the patentees explain that "[t]he wiring is kept in one plane." *Id.* at col. 5, lines 41-42.

In the context of claim 1, the phrase "the connecting lines being coplanar with the antenna and antenna terminals" means that the connecting lines are in a single plane with the antenna and the antenna terminals. This is clearly illustrated in the embodiment of Figure 2 shown below, where the connecting lines 225 share a common plane with the antenna 230 and its terminals (unnumbered but shown as extending inwardly therefrom). The common plane (which is perpendicular to the paper) has been identified by adding the line labeled "P":

FIG. 2



c. "connecting line" means "electrical conductor excluding the bonding types of thermal compression, single point bonding, C4 bonding, and conductive adhesive"

Connecting lines are electrical conductors that connect other conductors to each other. In the '222 Patent, the patentees gave a special meaning to this limitation, as it is used in the claims. This special meaning distinguishes between the connecting lines themselves and the bonding material that is used to

connect the connecting lines to components such as the circuit chip, the antenna and the battery.

The '222 Patent discloses two different connecting lines: (1) connecting lines between the circuit chip connectors and the antenna terminals ("antenna connecting lines"), and (2) connecting lines between the circuit chip connectors and the battery contacts ("battery connecting lines"). Figure 6, modified below to include component labels, shows a top view of the battery connecting lines 661, 662 connecting the battery 660 to the chip contacts (or connectors) 625:

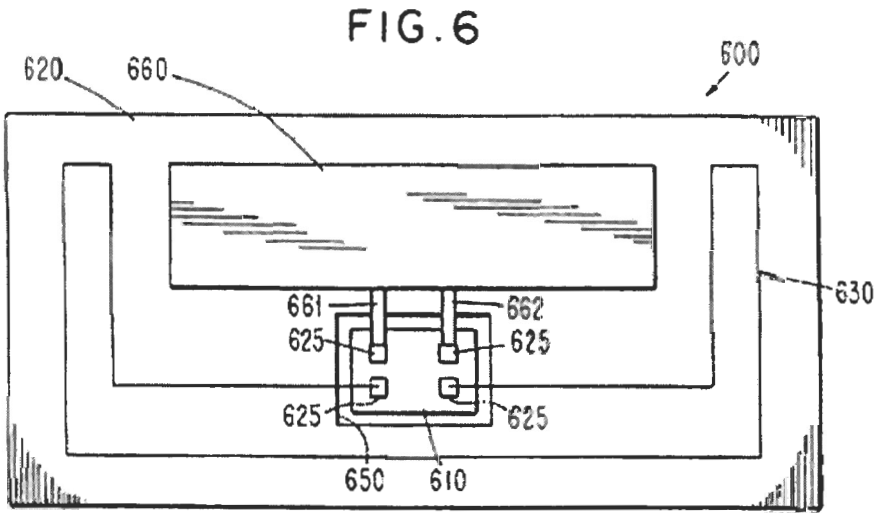
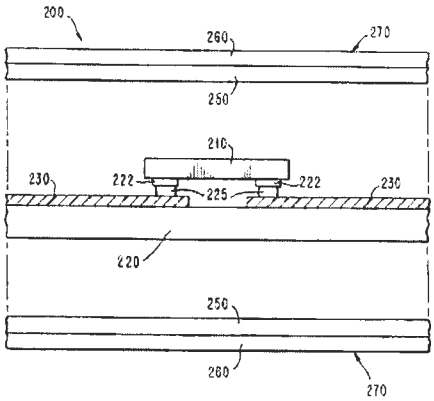


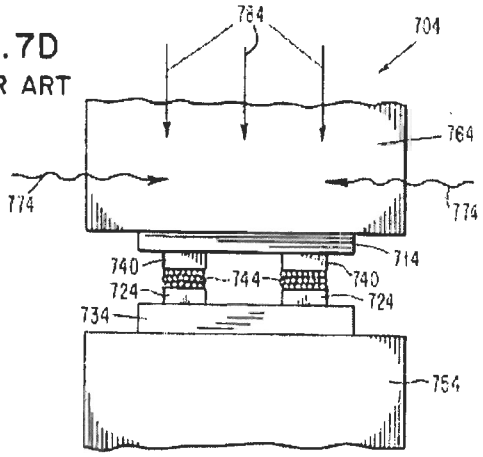
Figure 2, excerpted below, shows a side view of the antenna connecting lines 225 are in direct contact with the terminals of antenna 230 and the chip connectors 222:

FIG. 2



Claim 1 only recites the antenna connecting lines, and dependent claim 19 recites the battery connecting lines. The connecting lines can be connected to the chip contacts (also called connectors) by bonding. Examples of prior art bonding are shown in Figs. 7A-7E. Ex. 3 at col. 3, lines 46-50. An example of prior art bonding using a conductive adhesive 744 to connect chip connectors 740 to substrate pads (conductors) 724 is shown in a side view in Figure 7D excerpted below:

FIG. 7D
PRIOR ART



Dependent claim 5 (which is not asserted) depends from claim 1 and adds the bonding types as an additional element to the antenna connecting lines

recited in claim 1, namely, that "the connecting lines are bonded to the chip connectors using any of the bonding types including thermal compression, single point bonding, C4 bonding, and conductive adhesive." These bonding types are shown in prior art Figs. 7A-7E and are defined in claim 5 as an additional element, separate and apart from the antenna connecting line, and therefore are not included therein. The "connecting line" limitation of claim 1 cannot be construed to include these bonding types, since that would make claim 5 redundant and meaninglessly empty. *See Ethicon*, 93 F.3d 1572 at 1578 (construing claim language "connected to" to mean directly connected since a construction that included indirect connection would render the claim limitation "meaninglessly empty"). In other words, the antenna connecting line itself cannot include an element (the bonding type) that is separately claimed elsewhere (in claim 5) as a different element. The only proper construction for "connecting line" is therefore one that excludes the bonding types recited in claim 5.

This construction is equally applicable to the battery connecting lines recited in claim 19 (also not asserted). In an analogous manner to claim 5, claim 20, which depends from claim 19, recites that the "the battery contacts are connected to the battery connecting lines by any of the bonding types including spot welding, soldering, thermocompression bonding, and conducting adhesive." Accordingly, the patentees use the term "connecting lines" consistently in the claims to mean electrical conductors, but not the various bonding types, which are separate therefrom and are therefore excluded. *See Phillips*, 2005 WL 1620331, at *7

("Differences among claims can also be a useful guide in understanding the meaning of particular claim terms") (citing *Laitram Corp. v. Rexnord, Inc.*, 939 F.2d 1533, 1538 (Fed. Cir. 1991)). For example, the presence of a dependent claim that adds a particular limitation gives rise to a presumption that the limitation in question is not present in the independent claim. *See Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 910 (Fed. Cir. 2004).

B. THE '019 PATENT

The '019 Patent is directed to a method for grouping RFID tags to speed up communication between a reader (also called a base station) and a set of tags. The tags are divided into groups according to a physical characteristic of the RF signal backscattered[3] from the tags to the reader. For example, one way grouping tags is based on the physical signal strength (amplitude) of the RF signal sent by the tags to the reader. '019 Patent, Ex. 5, col. 3 at lines 3-6.

The '019 Patent seeks to improve known methods of reading all of the tags within the range of a reader. In the prior art and in the '019 Patent, if no tags are in the range of a reader, then there will be no response to the reader's RF interrogation signal, and the reader will know that no tags are present. If, on the other hand, only a single tag is present, that tag will respond and the reader will communicate with it without any interference. But when two or more tags respond, their RF signals will interfere with each other and require a method of

[3] "The 'rebroadcast' of the incoming RF energy at the carrier frequency is conventionally called 'back scattering.'" Ex. 5 at col. 1, lines 57-61.

communicating with them one at a time until they are all read. In the specification of the '019 Patent, the patentees discuss a number of prior art communication protocols where a reader communicates with a plurality of tags by

> polling the tags and shutting down tags in turn until there is just one left. The information is then exchanged between the base station [reader] and the one tag, and then the one tag is turned off. The unidentified tags are then turned on, and the process is repeated until all the tags have the communication protocol completed.

Ex. 5, col. at lines 45-52.

This and other multiple tag reading protocols are allegedly improved by the claimed invention of the '019 Patent by separating tags into groups. In particular, tags are grouped according to a physical characteristic of the RF signal sent by the tags to the reader, as opposed to the signal sent by the reader to the tag. As a result of the invention, "[i]f the tags can be selected into at least two groups, the communication protocol is speeded up." Ex. 5, col. 11 at lines 34-36.

Figure 2 of the '019 Patent illustrates one way of grouping according to the claimed invention, where tags are grouped on the basis of the polarization of their RF signals sent to the reader. By polarization, it is meant that the waves backscattered from the tags are spatially rotated due to the physical orientation of the tags as shown below:

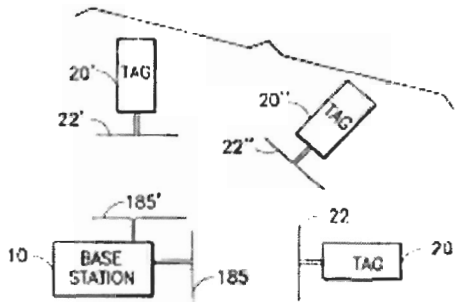


FIG.2

The base station or reader 10 has two perpendicular antennas 185 and 185' communicating with three tags 20, 20' and 20." Since the waves from tag 20 are 90° out of phase with antenna 185', antenna 185' will not pick up any signal from tag 20. The same is true for tag 20' and antenna 185. On the other hand, a signal from tag 20" will be received by both antennae 185 and 185'. Thus if the base station wants to group based on the polarity of the received signals, antenna 185 will receive signals from the group comprising tags 20 and 20". After they are both read using a multiple tag reading protocol known in the prior art, the group for antenna 185' will only comprise tag 20', which will then be read. *See* Ex. 5 at col. 4, lines 13-37.

According to the patent, other physical characteristics of the RF signal sent from the tags to the reader that can be used for grouping include carrier wave frequency, modulation frequency, signal strength, etc. Ex. 5 at col. 3, lines 3-18.

1. Claims 1 and 3

Claim 1 is an independent claim and is recited in its entirety below (with disputed terms underlined):

> 1. A method for communicating between a base station and a set of radio frequency RF transponders (Tags) comprising:
>
> defining a plurality of RF tags into different groups according to a physical wave characteristic of the electromagnetic wave energy received from the RF tags, and
>
> communicating with the tags in each defined group.

Claim 3 depends from claim 1 and further recites:

> 3. The method of claim 1 wherein at least one defining physical wave characteristic is the wave frequency.

a. "defining a plurality of RF tags into different groups" etc. means "defining a plurality of RF tags into different groups according to a physical wave characteristic of the electromagnetic wave energy received from the RF tags excluding grouping where the tags select themselves according to a signal from the base station"

Symbol's interpretation of this claim limitation is essentially its ordinary meaning to one skilled in the art including the specific exclusions made by the patentee during prosecution. *Phillips*, 2005 WL 1620331, at *9 ("[T]he prosecution history can often inform the meaning of the claim language by demonstrating how the inventor understood the invention and whether the inventor limited the invention in the course of prosecution, making the claim scope narrower than it would otherwise be.") (citing *Vitronics*, 90 F.3d at 1582-83; *Chimie v. PPG Indus., Inc.*, 402 F.3d 1371, 1384 (Fed. Cir. 2005) ("The purpose of consulting the prosecution history in construing a claim is to 'exclude any interpretation that was disclaimed during prosecution.'") (quoting *ZMI Corp. v. Cardiac Resuscitator Corp.*,

844 F.2d 1576, 1580 (Fed. Cir. 1988); *Southwall Techs., Inc. v. Cardinal IG Co.*, 54 F.3d 1570, 1576 (Fed. Cir. 1995))).

To overcome the prior art during prosecution of the application that led to the '019 Patent, the patentees added the limitation "physical wave characteristic" to original claim 29 (which became claim 1 in the issued patent). After adding this limitation, the patentees distinguished the claim as amended from the prior art:

> Claims 29-30, 38-39 are rejected on 35 U.S.C. 103(a) grounds. Neither Brophy et al, Cotie et al., nor Cesar et al. mention or suggest grouping the tags in accordance with "a physical wave characteristic of the electromagnetic wave energy received from the RF tags" Rather, the "tags" select themselves according to a signal sent from the "base station".

'019 File History, Ex. 6, Tab A, Response filed March 17, 1999 at 5.

Accordingly, the patentees excluded certain types of grouping from the scope of the claim. Specifically, they excluded grouping where the tags "select themselves" according to a signal sent from the base station. This was described in the prior art including, for example, U.S. Patent No. 5,673,037 to Cesar et al. (Exhibit 7) cited by the Examiner and distinguished by the patentees in the excerpt above. *See* Ex. 6 at Tab A. Cesar teaches that "[t]he process of moving the tags to the second state, SELECTED, is based on the data in the tag data memory." Ex. 7 at col. 2, lines 30-31. The selected tags then send an appropriate response to the reader. By distinguishing the Cesar reference, the patentees specifically disclaimed any coverage of the grouping method described therein.

In the '019 Patent specification, the inventors also distinguish between (a) grouping based on the physically measured characteristics of the backscattered

wave and (b) grouping based on information contained on the tags that is sent to the reader:

> The invention is not limited to the above examples. The selection of groups of tags from a set of tags on the basis of any physically measured characteristics or attributes of the returned signal from the tags in response to any physical characteristic or attribute of the signal sent from the base station is well within the scope of the invention, as is the combination of the selection of groups on the basis of both physically measured characteristics and information contained on the tags.

Ex. 5 at col. 12, lines 3-11 (emphasis added).

The patentees further distinguished grouping based upon physical wave characteristics of the backscattered signal versus the information contained on the tags where they select themselves (as disclosed in Cesar et al):

> Different groups may be selected by taking the union, the intersection, or other combinations of the various groups of tags selected according to the different physical attributes. The tag group selection parameters may also include selecting groups by software, i.e. by selecting the groups according to information stored on the tag.

Ex. 5 at col. 3, lines 21-27. (emphasis added)

The patentees therefore clearly distinguished between grouping based upon the physical wave characteristics of the signal sent from the tag to the base station and grouping based upon information stored in the tag where the tags select themselves.

By doing so, the patentees surrendered coverage of any grouping where the tags select themselves, *i.e.*, grouping based on a signal sent from the base station matching the information stored in the tag.

b. "communicating with the tags in each defined group" means "communicating with all of the tags in each group as grouped"

As explained above, the patentees state that their invention is an improvement on the multiple tag reading protocols known in the prior art, where all of the tags that are within the range of a reader are read one at a time until they are all read. The specification states that when tag signals cannot be read because they interfere with each other (which is the case whenever more than one tag is present), "a multiple tag reading protocol is instituted in order to read the multiple tags." Ex. 5 at col. 7, lines 53-61. Various known multiple tag reading protocols are described in the '019 Patent specification. *Id.* at col. 2, lines 11-58.

The whole purpose of the grouping step is to allow these multiple tag reading protocols to then read all of the tags in each group, as they have been grouped.

The inventors of the '019 Patent describe one of the known multiple tag reading protocols wherein "[t]he process continues until all tags in the field have been identified." Ex. 5 at col. 2, lines 18-19. They describe other multiple tag reading protocols as teaching "a communications protocol whereby a base station communicates to a plurality of tags by polling the tags and shutting down tags in turn until there is just one left. The information is then exchanged between the base station and the one tag, and then the one tag is turned off. The unidentified tags are then turned on, and the process is repeated until all the tags have the communication protocol completed." Ex. 5 at col. 2, lines 46-52.

In every one of the embodiments described in the patent, including the flow charts shown in Figures 5-9, when multiple tags are encountered in a group, a multiple tag protocol for reading all of the tags in the group is instituted. Ex. 5 at col. 7, lines 48-60 and Fig. 5 at 580; col. 8, line 61 - col. 9, line 16 and Fig. 6 at 660; col. 9, line 66 - col. 10, line 13 and Fig. 7 at 760; col. 10, lines 51-66 and Fig. 8 at 890; col. 11, lines 40-50 and Fig. 9 at 990.

Since the purpose of the invention is to speed up the reading of multiple tags normally read by prior art multiple tag reading protocols, it only makes sense that each group is read in its entirety as grouped. Otherwise, the "invention" would be unnecessary. *Phillips*, 2005 WL 1620331, at *7 ("The claims, of course, do not stand alone. Rather, they are part of 'a fully integrated written instrument,' consisting principally of a specification that concludes with the claims. For that reason, claims 'must be read in view of the specification, of which they are a part.' As we stated in *Vitronics*, the specification 'is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.'") (quoting *Markman*, 52 F.3d at 978-979 and *Vitronics*, 90 F.3d at 1582).

2. Claims 9, 11, 16 and 18

Claim 9 is an independent claim and is recited in its entirety below (with disputed terms underlined):

> 9. An RF tag base station comprising:
> a computer
> a transmitter

a receiver, and

at least one antenna,

wherein the RF tag base station communicates with a plurality of RF tags by:

interrogating the RF tags with electromagnetic energy,

grouping the RF tags according to a physical characteristic of their responsive electromagnetic signals, and

reading the RF tags in each group.

Claim 11 depends from claim 9 and further recites:

11. A base station as in claim 9 wherein RF tags are grouped according to the wave frequency of their respective return signals.

Claim 16 depends from claim 9 and further recites:

16. A base station as in claim 9 wherein RF tags are grouped according to the frequency modulation of their respective return signals.

Finally, independent claim 18 (with disputed terms underlined) reads:

18. An RF tag unit reading unit comprising:

a computer;

a transmitter;

a receiver, and

at least one antenna;

wherein the RF tag reading unit communicates with a plurality of RF tags by:

interrogating the RF tags with electromagnetic energy;

grouping the RF tags according to a physical characteristic of their responsive electromagnetic signals, and

reading the RF tags in each group.

a. "grouping the RF tags according to a physical characteristic of their responsive electromagnetic signals" means "grouping the RF tags according to a physical characteristic of their responsive electromagnetic signals excluding grouping where the tags select themselves according to a signal from the base station"

Symbol contends that this limitation should be construed the same as the "defining" step of claim 1, for the reason set forth above. For the sake of brevity, those arguments are not repeated here.

b. "reading the tags in each group" means "reading all of the tags in each group as grouped"

Similarly, Symbol contends that this limitation should be construed the same as the "communicating" step of claim 1. Again, those arguments are not repeated.

C. THE '632 PATENT

The '632 Patent relates to an apparatus and method for controlling a passive RF tag. Specifically, the '632 Patent teaches controlling the tag modulation frequency of the RF signal returned from the tag to the base station.

In order to set the carrier wave frequency and the modulation frequency of the base station, the base station uses a device called an oscillator. An oscillator is a circuit that produces a timing signal at a specific frequency. For example, an electronic watch includes an accurate oscillator that produces a timing signal that is used by the watch circuitry to count the seconds required to keep accurate time. Similarly, the tag uses one or more oscillators to control the carrier

and modulation frequencies of the RF signal returned from the tag to the base station. The returned RF signal is known as a "backscatter" signal because it is reflected or rebroadcast by the tag to the base station. Just like in the watch, the tag and base station circuitry use the timing signals from the oscillators to control the timing.

According to the invention, the tag oscillator used to determine the modulation frequency of the tag is controlled by the RF signal sent by the base station so that the base station RF signal determines the oscillation frequency.

1. Independent Claim 1

Claim 1 is an independent claim and is recited in its entirety below (with disputed terms underlined):

> 1. A passive radio frequency (RF) transponder (tag) for receiving an RF signal from a base station, comprising;
>
> a tag antenna for receiving the RF signal from the base station the RF signal having a carrier frequency;
>
> a tag rectification power supply connected to the tag antenna;
>
> a tag logic section and a tag memory section the tag logic section and the tag memory section receiving power only from the tag antenna through the tag rectification power supply;
>
> a receiver section connected to the tag antenna; and
>
> a tag oscillator connected to the receiver station, the tag oscillator having a plurality of possible discrete frequencies of oscillation, the tag oscillator having a tag oscillation frequency much less than the carrier frequency, the tag oscillator frequency used to determine a tag modulation frequency of an RF signal backscattered from the tag antenna, the tag oscillation frequency determined by the RF signal sent from the base station.

a. "backscatter" means "the rebroadcasting or reflection of the incoming RF energy at the carrier frequency"

There is no doubt as to what the patentees meant by the term "backscatter." They defined it in the patent as follows:

> The "rebroadcast" or "reflection" of the incoming RF energy at the carrier frequency is conventionally called "back scattering", even though the tag broadcasts the energy in a pattern determined solely by the tag antenna and most of the energy may not be directed "back" to the transmitting antenna.

'632 Patent, Ex. 8 at col. 1, lines 46-51.

Symbol proposes that the term "backscatter" be construed as defined above. This construction is also consistent with the one given in the '019 Patent discussed above, which has one inventor in common (Heinrich) and was filed for the same assignee at the time (IBM). "Backscatter" is defined in the '019 Patent as follows:

> The "rebroadcast" of the incoming RF energy at the carrier frequency is conventionally called "back scattering."

Ex. 5 at col. 1, lines 57-61.

Accordingly, the term "backscatter" should be construed as the patentees defined it. *Phillips*, 2005 WL 1620331, at *6.

b. "the tag oscillation frequency determined by the RF signal sent from the base station" should be given its ordinary meaning

The plain meaning of this limitation is that the tag oscillation frequency is determined by the RF signal sent to the tag from the base station. The

patentees have not indicated anywhere in the patent or its file history that any special or narrower meaning should be given to this limitation.

As explained above with respect to the operation of an RFID tag, the signal from the base station includes a carrier signal that has a carrier frequency and an amplitude, and which is modulated with information at a modulation frequency. The language of claim 1 that is at issue is deliberately broad so as to include determination of the tag oscillation frequency by any characteristic of the RF signal sent by the base station. Ex. 8 at col. 3, lines 50-60.

The patentees express their intent to define the invention broadly in the Summary of the Invention section of the '632 Patent:

> The present invention is to have a passive RF tag with a tag oscillator with an oscillation frequency which the tag can lock to a signal sent from the base station to the tag. An innovative low current oscillator design accomplishes this invention. Innovative low current ancillary circuits are also provided. The preferred signal is the modulation frequency of the modulated RF signal that the base station sends to the tag.

Ex. 8 at col. 3, lines 8-15.

Thus, while the patentees described their preferred embodiment—modulation frequency—and claimed it in dependent claims 2, 14 and 23, they clearly intended the term "determined by the RF signal sent from the base station" to be more broadly applicable to other characteristics of the RF signal, *i.e.*, carrier wave frequency, carrier wave amplitude, etc. They specifically confirm this in the specification, stating that "any pattern or subpattern in the signal sent out from the base station could be used to generate an output of the signal receiving section 36 in

order to adjust the frequency and optionally the phase of the tag oscillator." Ex. 8 at col. 4, lines 27-31.

As discussed above, the specification and other claims clearly indicate that this limitation should be given its ordinary meaning in the context of the patent disclosure and should not be limited to a particular preferred embodiment or a limitation that is already included in the dependent claims. *Phillips*, 2005 WL 1620331, at *7 ("Differences among claims can also be a useful guide in understanding the meaning of particular claim terms. For example, the presence of a dependent claim that adds a particular limitation gives rise to a presumption that the limitation in question is not present in the independent claim.") (citing *Laitram Corp. v. Rexnord, Inc.*, 939 F.2d 1533, 1538 (Fed. Cir. 1991) and *Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 910 (Fed. Cir. 2004)); *TurboCare Div. of Demag Delaval Turbomachinery Corp. v. Gen. Elec. Co.*, 264 F.3d 1111, 1123 (Fed. Cir. 2001) (claim terms should not be read to contain a limitation "where another claim restricts the invention in exactly the [same] manner"); *Dow Chem. Co. v. United States*, 226 F.3d 1334, 1341-42 (Fed. Cir. 2000) (concluding that an independent claim should be given broader scope than a dependent claim to avoid rendering the dependent claim redundant).

2. Independent Claim 13

Claim 13 is another independent claim. It reads (with disputed terms underlined):

> 13. A method of setting a tag oscillation frequency of a tag oscillator of a passive RF tag comprising;

a) receiving an RF signal from a base station, and;

b) adjusting the tag oscillation frequency in response to the RF signal from the base station, wherein the tag oscillation frequency is much less than a carrier frequency of the RF signal, and wherein the tag oscillator frequency is used to determine a tag modulation frequency of an RF signal backscattered from the tag.

a. "backscatter" means "the rebroadcasting or reflection of the incoming RF energy at the carrier frequency"

This limitation has the same meaning as that used in claim 1. Accordingly, the reasons for the construction of this limitation are the same as that for claim 1 and are not repeated here.

b. "adjusting the tag oscillation frequency in response to the RF signal from the base station," should be given its ordinary meaning

The plain meaning of this limitation is that the tag oscillation frequency is determined by the RF signal sent to the tag from the base station. The reasoning behind this construction is the same as that given for the corresponding "determined by" limitation in claim 1 and is therefore not repeated here.

3. Independent Claim 22

Claim 22, another independent claims, reads (with disputed terms underlined):

22. A system for sending and receiving modulated RF signals, comprising;

a base station for sending modulated RF signals, the RF signals having a carrier frequency; and

at least one passive RF tag for receiving the RF signals, the RF tag comprising a tag antenna for receiving the RF signal from the base station, a tag

> receiver section connected to the tag antenna; and a tag oscillator connected to the tag receiver section, the tag oscillator having a tag oscillation frequency much less than the carrier frequency, the tag oscillation frequency used to determine the [sic] a modulation frequency of an RF signal backscattered from the tag antenna, the tag oscillator frequency determined by the RF signals sent from the base station.

a. "backscatter" means "the rebroadcasting or reflection of the incoming RF energy at the carrier frequency"

Again, this limitation has the same meaning as that used in claim 1. Accordingly, the reasons for the construction of this limitation are the same as that for claim 1 and are not repeated here.

b. "the tag oscillator frequency determined by the RF signals sent from the base station" should be given its ordinary meaning

The plain meaning of this limitation is that the tag oscillation frequency is determined by the RF signal sent to the tag from the base station. The reasoning behind this construction is the same as that given for the corresponding "determined by" limitation in claim 1 and is not repeated here.

4. Independent Claim 28

Claim 28 is the final independent claim of the '632 Patent. It reads (with disputed terms underlined):

> 28. A passive radio frequency (RF) transponder (tag) for receiving an RF signal from a base station, comprising;
>
> a tag antenna for receiving the RF signal from the base station, the RF signal having a carrier frequency;
>
> a receiver section connected to the tag antenna;

> a tag rectification power supply connected to the tag antenna;
>
> a tag logic section and a tag memory section, the tag logic section and the tag memory section receiving power only from the tag antenna through the tag rectification power supply; and
>
> a tag oscillator connected to the receiver section, the tag oscillator having a tag oscillation frequency much less than the carrier frequency, the tag oscillation frequency used to determine a tag modulation frequency of an RF signal backscattered from the tag antenna, the tag oscillation frequency determined by the RF signal sent from the base station.

a. "backscatter" means "the rebroadcasting or reflection of the incoming RF energy at the carrier frequency"

For the reasons discussed above, this limitation has the same meaning as that used in claim 1.

b. "the tag oscillation frequency determined by the RF signal sent from the base station" should be given its ordinary meaning

The plain meaning of this limitation is that the tag oscillation frequency is determined by the RF signal sent to the tag from the base station. The reasoning behind this construction is the same as that given for the corresponding "determined by" limitation in claim 1 and is therefore not repeated here.

V. CONCLUSION

For the foregoing reasons, Symbol respectfully requests the Court to adopt the claim constructions discussed above for the disputed claim terms in the Intermec Patents.

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July 25, 2005

CERTIFICATE OF SERVICE

I hereby certify that on July 25, 2005, I caused to be electronically filed a true and correct copy of the foregoing ***Symbol's Opening Claim Construction Brief*** with the Clerk of Court using CM/ECF which will send notification of such filing to the following counsel of record:

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